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ABSTRACT

Designed to assist individuals who need to bring information to citizen groups or decision makers concerned with community economic development, this manual uses a question-answer format to cover topics that might occur to someone just starting to build an understanding of community economic analysis. Among topics covered are: strategies for economic development; multipliers of employment, income, and turnover; assessing size and shape of community trade area; keeping local dollars in the community; measuring the efficiency of local firms; stimulating new firms; and government aid. Theories and tools of economic analysis are drawn from disparate sources and clarified by example as they appear in the text. The need to integrate different forms of analysis is demonstrated. The 25-page appendix uses hypothetical cases to describe how to calculate the specific tools and interpret resulting data. A 41-item bibliography provides additional sources of information about the tools and theories. An index is included. (LFL)

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Community Economic Analysis

A How To Manual

by Ron Hustedde
Ron Shaffer
Glen Pulver

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COMMUNITY ECONOMIC ANALYSIS:

A HOW TO MANUAL

By

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November 1, 1984

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PREFACE

This manual is intended for the individual interested in the analysis of a community's economy. It is not designed for direct use in citizens' meetings. Rather the publication is designed to assist individuals who need to bring information to a group of citizens or decision makers concerned with the economic future of a community.

We encourage the user to first completely read the document. The manual poses a series of questions that might occur to someone who is preparing to share information with a group of people or just starting to build an understanding of community economic analysis. This publication contains analytical tools that are usually found in disperate sources. Our purpose is to demonstrate the need to integrate different forms of analysis. However, this publication is not a comprehensive report of community economic analysis tools and the reader is encouraged to pursue further understanding through the readings in the bibliography.

After the complete reading, the user is encouraged to use the table of contents and index to locate specific items that are of particular interest.

WHY A COMMUNITY ECONOMIC ANALYSIS MANUAL?

Recent swings in the national economy have heightened the interest of individuals and businesses about economic conditions in their communities and what might be done about them. A community's economy lends itself to analysis similar to that of households and businesses. While the specific forms of this analysis may not be widely known, it still raises the same questions. What are the current economic conditions in the community? What components of the community have been growing or which components have been declining? What are the community's options for improving its economic future and which of those options should be pursued first?

Numerous tools and techniques can be used to give some insight to the functioning of a community's economy. This insight is part of the early preparation necessary before the community can initiate an effective strategy for change. The following considerations must be an important part of any community economic analysis:

- First, no single number, generated by the analysis, provides the answer to all the community's concerns. For instance, when a firm experiences an increase in profits, it is still unknown whether the increase is caused by greater sales or more cost efficient production. Each of those sources suggests a different strategy by the owner.
- Second, it is important to make comparisons among communities because none of the numbers used are absolute. Again, just as any owner of a

firm would compare his/her success against the industry average or similar firms, it is important for communities to make similar comparisons. These comparisons need to be among similar communities to increase their legitimacy.

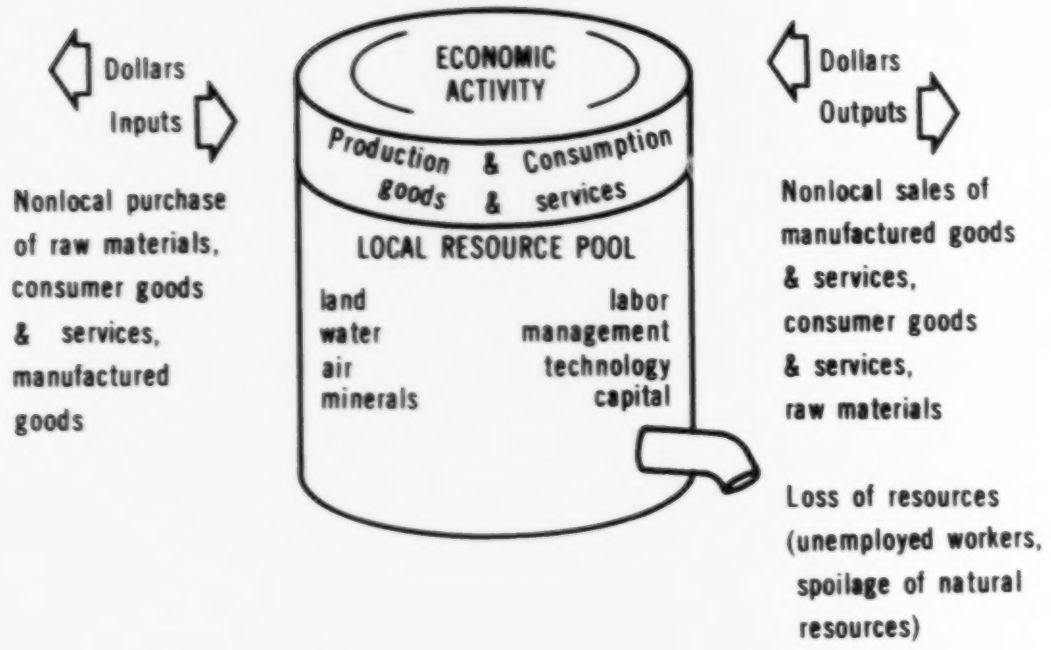
- Third, it is important to compare changes over time to sense the direction of change community. This comparison helps to confirm or deny perceptions of current and recent conditions.
- Fourth, it is crucial to use a variety of information sources. The steps outlined in this publication indicate that "hard data" collected from various agencies is a starting point. It is important the analyst also incorporate the insights that local citizens have about their community and its economy. If there are differences, then both sets of information need to be challenged to determine which more accurately reflects current conditions.

The following pages outline, through a series of questions, some elemental steps that might be undertaken by a community examining its economy and its economic future. An Appendix describes how to calculate the specific tools along with needed data and interpretation. Readers are referred to the bibliography for additional readings and resource material.

Perhaps one way to imagine of community economic analysis is to imagine the community's economy as a barrel with money and goods flowing into the top as well as spilling out (see Figure 1). The barrel analogy represents a number of key concepts. First, the community is intimately linked with the rest of the world through the inflow and outflow of income and goods. Second, the community uses resources to produce the output it sells. These resources can be available locally or purchased elsewhere. Third, the size of the barrel is determined essentially by the inflow of outside income, the lack of leakage of income, and the volume of resources used to produce the community's output.

FIGURE 1

THE COMMUNITY ECONOMY SIMPLIFIED



Community economic analysis is a systematic examination of the components of this barrel. This examination is concerned with the forces of demand and supply and their institutional environment. This can be translated into some elemental questions: What are the linkages with the rest of the world? What are some ways to increase the potential inflow of income? How can the community better use its existing resources and businesses to produce more output and associated jobs and income? How can the community reduce the loss of resources to improve its local income situation?

1. *WHY SHOULD A COMMUNITY TRY TO CHANGE ITS LOCAL ECONOMY? CAN'T THE LOCAL ECONOMY TAKE CARE OF ITSELF?*

Most communities are not completely satisfied with their local economy. Some want more job opportunities or income growth for all their

citizens or for specific groups such as women, minorities, or youth. Other communities want manageable economic growth so they can carefully plan their sewers, streets, schools, and other parts of the local infrastructure. Some communities are concerned primarily with their environment and quality of life and want economic growth to reflect those concerns. Other communities are faced with economic decline and wish to alter the current trend.

Few communities choose to remain completely passive. For example, most have chambers of commerce, economic development commissions, zoning laws, or community-owned industrial parks. They may use promotional efforts, government grants, and various financing tools to influence economic change. Community economic analysis is a way to link and focus those efforts.

2. *EXACTLY WHAT IS MEANT BY COMMUNITY ECONOMIC ANALYSIS?*

There is nothing particularly unique about community economic analysis. It is simply an examination of how a community functions economically. It is similar to how a business examines new products or new markets or new ways to make or distribute existing products. A community can do the same type of analysis for the goods and services it provides. However, the products are satisfactory jobs and income for current and future residents of the community.

3. *HOW CAN COMMUNITY ECONOMIC ANALYSIS HELP A COMMUNITY DO SOMETHING ABOUT ITS JOB AND INCOME SITUATION?*

That is the central purpose of community economic analysis. While community economic analysis does not provide solutions to the problem, it

provides the information to make decisions. It uses analytical tools to answer some of the questions a community needs to ask, as it attempts to alter its job and income situation.

4. *WHAT TYPE OF QUESTIONS?*

The questions vary, but some examples include: What is the major source of local income growth? What types of commercial activities might be possible? What changes have been occurring in the trade area?

5. *YOU MENTIONED INCOME AND EMPLOYMENT CHANGE. DOES THAT MEAN THE COMMUNITY NEEDS TO HAVE THAT TYPE OF INFORMATION AVAILABLE?*

That is correct. While information is not always readily available, it is often collected by a variety of state and federal agencies. This means checking with the appropriate agency in your state or locale. Comprehensive information with specific application to the question at hand is always desired, but highly unlikely.

6. *WHO MIGHT PROVIDE THE NECESSARY INFORMATION?*

The county extension office, planning office (regional, county, or city), and local public library (larger cities) often have this information available in their reference section. State agencies are major collectors of this data. They collect it for administrative purposes, such as unemployment insurance, sales tax information, etc. Often the appropriate information can be found in those agencies. The Census of Business (retail trade, selected services, and manufacturing) along with County Business Patterns are prime data sources.

7. *WHAT TYPE OF INFORMATION WILL BE NEEDED?*

The type of information needed will depend on the particular questions being asked plus the amount of time the community wishes to devote to collecting data. Generally, a minimum of three types of data are needed: employment, income by source and amount, and sales by economic sector.

8. *WHAT DO YOU MEAN BY ECONOMIC SECTOR?*

Typically, data is collected by economic sector, e.g., farming, durable manufacturing, retail trade etc. Thus, it can be categorized by the major output produced. The classification scheme most often used is the Standard Industrial Classification (SIC) code. It is just a way of categorizing economic activity into economic sectors.

One of the more elementary forms of analysis is to compare the distribution of employment in the community in various sectors with state or national averages. This comparison becomes an initial mechanism for determining how different or similar the local economy is with some "standard." A slightly different version of this form of analysis is to compare income by type (wages and salaries, transfers etc.) or source (agriculture, manufacturing, government etc.) Again, this provides a means of identifying significant sources of income. This begins to give some insight to how dependent the community is on certain economic sectors for employment or income.

9. *WHAT ARE SOME OF THE QUESTIONS COMMUNITY ECONOMIC ANALYSIS ADDRESSES?*

The questions vary by community and there is no standard list. This handbook presents tools to help provide answers to the following questions:

What businesses are linked to outside/nonlocal markets?

How will a change in these businesses affect the rest of the local economy?

What is the geographic area community merchants might expect to sell to?

What are the potential retail and service sales for the community?

How effective has the community been in attracting and keeping retail and service sales?

Have recent employment changes in the community been due to national economic growth, the type of local businesses or the efficiency of local businesses?

10. HOW DO THESE QUESTIONS RELATE TO COMMUNITY ECONOMIC ANALYSIS?

A community can be perceived as responding to two sets of market forces--local and nonlocal. Community economic analysis is largely an analysis of how the community responds to these forces. The community's linkage to nonlocal markets and how that is translated back into the community is a major source of economic change for the community. An equally important force is how the community serves and uses the local market to create jobs and income.

NONLOCAL MARKETS LINKAGE

11. HOW ARE COMMUNITIES LINKED TO NONLOCAL MARKETS?

They are linked through the sales of both goods and services to nonlocal consumers or by the attraction of consumers to the community. They also are linked through the sales of both goods and services from outside the community.

12. *A COMMUNITY'S ECONOMY IS COMPLEX. HOW CAN ONE START TO MAKE SENSE OUT OF IT?*

Business leaders and others involved in community economic development have often explained the complexity of the local economy by dividing it into two parts. One part attracts money into the community from the outside, i.e., nonlocal markets. The other part uses the money once it is in the community, i.e., local markets.

13. *WHAT DO YOU MEAN "ATTRACTS MONEY"?*

Income enters the community from manufacturing, mining, and agriculture as well as tourism, universities and technical schools, insurance companies, hospitals, and transportation selling their output to nonlocal customers. A community can sell goods and services, e.g., manufactured goods or insurance coverage, to non-local markets to be used elsewhere. Or the non-local consumer can come to the community for consumption as illustrated by tourism or health care. In any case, the money is generated from outside the community's boundaries. The businesses which bring money into the community are often referred to as the basic or export sector.

14. *WHAT HAPPENS TO THAT MONEY ONCE IT IS IN THE COMMUNITY? SHOULD WE BE CONCERNED HOW IT IS USED?*

Definitely, the community should be concerned with how money is used once it is attracted to the community. There are really two possible uses. First, the local economy must offer the consumer a chance to spend his/her money locally. If not, the income flows out which is the second consideration. Income flows out of the community in various ways. For example, when a local household purchases goods and services outside the

local community money leaks out of the local economy. When a local firm buys from a supplier outside the community, those dollars also flow out of the community. As a result of that leakage, potential income and jobs in the community are lost.

15. *IT WAS MENTIONED THAT EXPORT FIRMS BRING IN INCOME. ARE ALL BUSINESSES EXPORTERS?*

No. Most are referred to as non-export because they do not attract the largest portion of their sales from outside. Non-export businesses serve the needs of local consumers and firms. The community needs to identify export and non-export sectors, not because one is more/less important than the other, but because they respond to different economic forces, i.e., local versus nonlocal forces.

STRATEGIES FOR ECONOMIC DEVELOPMENT

16. *TRADITIONALLY MANY COMMUNITIES HAVE FOCUSED THEIR EFFORTS TO BUILD EXPORT LINKS ON ATTRACTING MANUFACTURING FIRMS. ARE THERE OTHER OPPORTUNITIES FOR JOB AND INCOME DEVELOPMENT?*

The traditional response of communities has been to build industrial parks in efforts to lure manufacturers to their municipality. However, the many vacant industrial parks scattered throughout the country are poignant reminders that rural communities should also look at other possibilities for economic growth. For example, computer services, insurance, health care, tourism and service-related businesses are growing faster than manufacturing. Job and income growth is also generated through Social Security and pension benefits, food stamp programs, and other sorts of government aid. These are mechanisms to increase the flow of income into the community, e.g., inflow to the barrel. Establishing new businesses

also plays a significant role in new job formation. Improving the efficiency of existing firms is another important avenue. Communities cannot afford to overlook any of these opportunities.

17. *DOES THIS MEAN THAT MANUFACTURING IS NO LONGER A VIABLE AVENUE TO COMMUNITY ECONOMIC DEVELOPMENT?*

Most communities interested in increasing their income and employment should continue recruiting manufacturing firms to their area. However, communities must look at other avenues for economic development in addition to manufacturing recruitment if they want to increase their chances for job and income expansion. First, they need to expand their definition of basic to include more than just manufacturing. Second, a frequent shortcoming of many community economic development programs is the emphasis on export businesses and failure to use other avenues for economic development that may be more successful and efficient.

18. *WHAT ARE THESE OTHER ECONOMIC DEVELOPMENT ALTERNATIVES?*

One way of determining if a community has thought through all of its alternatives is to see if it is actively pursuing each of the following five general strategies:

1) attracting new basic or export employers,
2) capturing existing markets,
3) encouraging the starting of new firms,
4) helping existing firms become more efficient, and
5) utilizing aids and programs from broader levels of government.

There is nothing sacrosanct about these five, and you may wish to generate your own list. The critical point is traditional community economic

development efforts have too often been limited to attracting new export employers.

19. *YOU MENTION FIVE STRATEGIES FOR COMMUNITY ECONOMIC DEVELOPMENT. ARE THERE TOOLS OR TECHNIQUES THAT CAN HELP ME DETERMINE WHICH OF THOSE STRATEGIES IS MOST APPROPRIATE?*

Not really. The tools reviewed in this manual can be used to provide some guidance about which strategy and what components of that strategy might be most appropriate. But there is no one-to-one match of tool and strategy. One needs to keep the strategies in mind when interpreting the information gained from the tools. Then you can use that information to help reach a decision about a given strategy.

MULTIPLIERS

20. *WHAT IS SO SIGNIFICANT ABOUT THE ATTRACTING OF A NEW EXPORT EMPLOYER?*

The significance of new export employers is that generally they are able to create more jobs and income in the community than are found at the site of the new export employer. Furthermore, they tend to be a highly visible source of employment change.

21. *IS THAT THE MULTIPLIER PROCESS THAT IS SO WELL KNOWN?*

Yes it is. But the multiplier is probably over-rated and overused in community economic analysis.

22. *WHAT DO YOU MEAN?*

The multiplier essentially assumes once an export employer locates or expands in the community the multiplier effect will occur automatically and

the effect will be local. This is not accurate. Furthermore, most estimates of the multiplier exceed the reality of the change.

23. *JUST WHAT IS A MULTIPLIER?*

The multiplier arises from the linkages and interaction of the export sector (water pouring in the top of our barrel--dollars entering the community) and the other businesses and households in the community. If there are no linkages (local purchases of labor, suppliers, materials etc.) then there can be no multiplier effect.

24. *YOU INDICATE THERE ARE DIFFERENT TYPES OF LINKAGES.*

Yes. These linkages can occur through the hiring of workers, or the disbursing of a payroll or the purchase of inputs and supplies or consumption by households.

25. *DOES THAT MEAN THERE ARE DIFFERENT TYPES OF MULTIPLIERS?*

Yes there are. Let's examine employment multipliers first. An employment multiplier is a simple expression of the relationship between the number of workers in export businesses and the total employment in the community.

26. *HOW IS THAT DONE?*

A ratio is formed of total employment divided by export employment and this gives the multiplier estimate:

$$\text{employment multiplier} = \frac{\text{total employment in community}}{\text{export employment in community}}$$

This is known as the average employment multiplier.

27. WHAT DO YOU MEAN AVERAGE EMPLOYMENT MULTIPLIER?

It represents an average in two senses. First, it estimates the average of all the different types of businesses in the export sector. Any one of those businesses may have a multiplier larger or smaller than the estimate. The export multiplier is a "quick and dirty" way to estimate multipliers. If you wanted a multiplier for a specific sector of the local economy, you would have to use input-output analysis, which will not be discussed in this manual because it requires a substantial amount of data and computer capacity. Second, the multiplier estimated above represents an average because it measures the relationship between the export base and the total economy at one point in time rather than the change in employment over time as would be the case if the export sector increased or declined. The multipliers estimated from changes in employment are often labeled marginal employment multipliers.

28. HOW IS THE MARGINAL EMPLOYMENT MULTIPLIER CALCULATED?

The easiest way to calculate the marginal employment multiplier is to use this ratio:

$$\text{Marginal Employment Multiplier} = \frac{\text{Change in Total Employment}}{\text{Change in Export Employment}}$$

29. WHICH IS THE BETTER ESTIMATE?

Again, it depends on what you wish to do with the estimate. In most cases, the average multiplier is sufficiently accurate.

30. *HOW CAN THE EXPORT SECTOR IN THE DENOMINATOR BE IDENTIFIED?*

The export sector is the businesses that sell their product to non-local markets. One way to identify them is by observation. That is fairly easy in small communities but is subject to a lot of error.

31. *ERROR IN WHAT SENSE?*

The classic problem is that all the workers at any given business are not engaged in the production for a nonlocal market, but some are producing for local markets. The question becomes how can the workers be allocated to the "proper market" they are serving.

32. *WHY IS THAT SO IMPORTANT?*

Let us take a simple example. We have a community with a total employment of 350 jobs. Export employment could vary depending on whether all or just part of the workers in some businesses are counted as serving a nonlocal market. The significance is how this difference affects the multiplier estimate:

$$\text{multiplier} = \frac{\text{Total}}{\text{Export}}$$

In our example, if 100 jobs are in the export sector, the multiplier is 3.5, but if 175 jobs are in the export sector the multiplier is 2.0

33. *HOW CAN THE EXPORT SECTOR BE ESTIMATED TO CAPTURE ONLY THE NONLOCAL MARKET WORKERS?*

Location quotients can be used to distinguish the proportion of a business's workforce serving local or non-local markets. (Location quotients are explained more fully on page 36-41).

34. *HOW ABOUT A SIMPLE EXAMPLE OF HOW THIS IS DONE?*

To determine the export employment for any business or sector the following formula can be used:

$$\text{Percent Export} = \left\{1 - \frac{1}{LQ}\right\} \times 100\%$$

This formula is used only for those businesses or sectors that have a location quotient greater than one (1). To determine the number of export employees in the community the total employment of each business or sector is multiplied by the appropriate percentage and summed over all sectors.

Let's say the community has three sectors and their location quotients are as indicated. The export employment would total 55.

Sector	Total Employment	Location Quotient	Percent Export	Export Employment
A	50	2.00	50	25
B	5	.75	0	0
C	40	4.00	75	30
TOTAL	95			55

$$\text{Employment multiplier} = \frac{95}{55} = 1.73$$

35. *IF THE EXPORT SECTOR INCLUDES BUSINESSES THAT BRING INCOME INTO THE COMMUNITY THEN IT COULD INCLUDE MORE THAN JUST THE TRADITIONAL EXPORT ACTIVITIES SUCH AS FARMING AND MANUFACTURING?*

Correct. For the most part, the location quotient approach allows you to include most of the non-traditional export activities.

36. *WHAT DO YOU MEAN BY MOST OF THE NON-TRADITIONAL ACTIVITIES?*

A very definite export activity in many communities is the income received by retirees through their social security, medicare, private retirement programs etc. These also need to be included.

37. HOW?

It is really a lot easier than you might expect. You just simply add the number of social security recipients in the community to the export employment estimated using the location quotient approach. Because the social security recipients represent a "pure" inflow of funds to the community, they all can be counted as part of the export sector.

So in our previous example, if our community had eight social security recipients, they would be added to the 55 export base employees to give a new export base of 63. The new multiplier would be:

$$\frac{95}{63} = 1.51$$

38. THAT SOUNDS EASY ENOUGH.

It is, but then again employment multipliers are easier to estimate than income multipliers.

39. WHAT DO YOU MEAN?

While the same relationship between the export sector and the total economy holds, the estimation of the export sector income is more difficult.

40. HOW IS AN INCOME MULTIPLIER CALCULATED?

It is determined by using the formula:

$$\text{local income multiplier} = \frac{1}{1 - (MPC_L \times PSY)}$$

The marginal propensity to consume locally (MPC_L) represents the proportion of total income people spend locally. One can make a crude estimate of the MPC_L by asking "What proportion of people's incomes are

likely to be spent locally?" If it is high, one would use an MPC_L, such as .60 to .80. On the other hand, if a community is small and most goods and services are purchased elsewhere, the MPC_L might be as low as .20. This varies by community. The MPC_L typically ranges from .20 to .70. The most common ranges are .30 to .60.

41. WHAT REDUCES THE MPC_L?

MPC_L is reduced 1) by in-commuters spending their wages where they live - not where they work, 2) the portion of workers paychecks withheld for taxes and fringe benefits - ranging from 15% to 30% of payroll, and 3) local residents spending some of their wages in neighboring communities or larger regional shopping centers.

42. WHAT DOES PSY REPRESENT?

PSY is the percentage of money spent locally that becomes local income. Local income is local wages, salaries, profits, and interest. The PSY will typically range from .25 to .75. This variable measures how much local labor, interest, and profit is involved in the final price of the product. For local fast food restaurants, it may be high, while for auto sales it may be quite low.

43. HOW CAN MPC_L AND PSY AFFECT THE MULTIPLIER?

An example might help demonstrate their affect. If the MPC_L is high, e.g., .8 and the PSY is also high, e.g., .75 the multiplier will be larger.

$$\frac{1}{1-(.8 \times .75)} = 2.5$$

This multiplier is more likely in a larger community (50,000 people or more) than in a smaller community. The other extreme occurs when most of a

community's income is spent elsewhere (low MPC_L), and little of the local spending becomes local income (low PSY). In this case let MPC_L equal .2 and PSY equal .25. Here the multiplier becomes:

$$\frac{1}{1 - (.2 \times .25)} = 1.05$$

The total change in community income is only slightly larger than the gross payroll of the business.

44. *ARE THERE OTHER TYPES OF MULTIPLIERS?*

Yes. There are sales or output multipliers, solid waste or environmental discharge multipliers, etc. Essentially, if one can estimate a ratio of changes in output and the item of concern, you can create a multiplier.

45. *I HAVE HEARD OF A TURNOVER RATIO. IS THAT A MULTIPLIER?*

It is a form of sales or output multiplier, but is <u>not</u> a true multiplier.

46. *WHAT IS TURNOVER?*

Turnover is the number of times a dollar changes hands in the community. It does not represent an economic linkage, which is critical to multiplier analysis. In Figure 2, the turnover is five, but only one cent is still in the community for that fifth turnover. The multiplier is only 1.66 in this example.

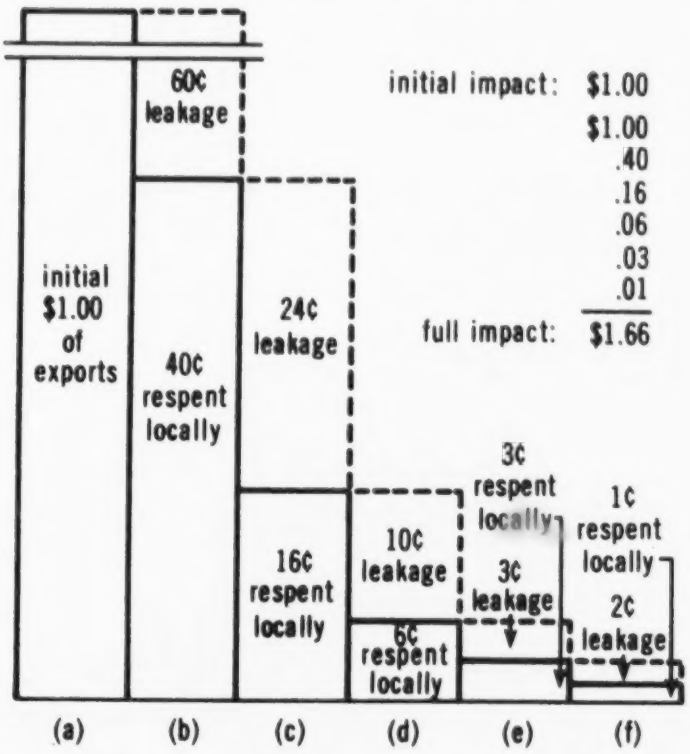
47. *I AM STILL NOT SURE I UNDERSTAND WHAT YOU ARE SAYING?*

Let us say a community is able to expand one of its export businesses. How will a one dollar change in wages paid by that particular business

affect other sectors of the local economy? Let us look at the original dollar coming into the community. Say 60 cents of that dollar flows out of the community through nonlocal taxes, equipment purchases and other items. So 40 cents remains for local wages, taxes, raw materials, and rent. Let us say of the 40 cents that is spent locally, only 16 cents remain in the community (again a 60 percent leakage). Of the 16 cents respent locally only six cents remain, and when that is respent only three cents remain, and finally less than one cent. At this point, it is hard to measure further effects. This example illustrates that the economic impacts resulting from a one dollar change in export activity leads to a change of $1.66 in the local economy. The multiplier here is 1.66. Figure 2 depicts this process.

FIGURE 2:

MULTIPLIERS AND TURNOVER



Source: WRDC

48. *WHY IS THIS DISTINCTION IMPORTANT*

It becomes important for planning. If you are merchant planning an expansion because of a new export employer, you need to use 1.66 rather than 5, in our example, or you will overexpand.

49. *IS IT EASY TO MISUSE MULTIPLIERS?*

Yes! Some people have viewed the employment and income multiplier as the same thing. It should be stressed they are different even though they have similar values. So you can not use one for the other.

It should also be mentioned that no matter how one estimates the multiplier, it tends to be inflated.

50. *WHAT DO YOU MEAN?*

Multipliers presume there will be no change in the local economy without a change in the export sector. This fails to capture the possible changes in MPC_L and PSY that may occur. (See later discussion about transferring multipliers.) Furthermore, it takes time for the multiplier to become fully implemented. Other changes will often dampen its effect.

51. *WHAT CAN A COMMUNITY LEARN FROM A MULTIPLIER?*

The community can use the multiplier to estimate the total effect of a development event before it happens. Such estimates will help the community prepare for the event.

52. *CAN A COMMUNITY APPLY A MULTIPLIER FROM A SIMILAR LOCALE TO ITS SITUATION?*

It is important to note that the multiplier from another place or period is not automatically transferrable. Some of the conditions that influence the size of a community's multiplier are:

Population. The value of a multiplier varies with the population. Smaller communities, for example, have smaller multipliers because they cannot profitably produce or sell (insufficient market) all the goods and services needed locally to capture consumer spending, i.e., a lower marginal propensity to consume locally (MPC_L).

Geographic size of the community. The larger the geographic area considered, the greater the ability of the area to supply and consume the goods and services desired, e.g., higher MPC_L.

Transportation networks. Easy access to competing nonlocal sources of goods and services will reduce the local multiplier.

Income changes. The multiplier is not likely to remain constant as community income changes. If a new economic activity leads to population changes by attracting more workers to the community, local consumption is likely to increase because new stores will appear. Or if the activity leads to more income per person but little population change, local people may purchase more non-local goods, their taxes increase and they may increase their savings, which leads to a lower multiplier.

Economic Specialization. A highly specialized economy, such as isolated mining towns which are less able to meet the needs of local households, will find consumers making periodic non-local shopping trips or using mail order catalogues. These reduce the local multiplier.

Time. Multipliers change over time. Let us say a firm moves into a community. At first, it may depend on its former non-local suppliers. However, as time progresses it may switch to local suppliers. New support businesses may also eventually emerge to capture local dollars. It takes time for the multiplier effects to occur. First, the local merchants may need to change merchandise lines and/or expand to meet the new demands.

Second, it requires time before individual merchants perceive and react to the changes in their market.

53. *SUPPOSE A COMMUNITY DETERMINES IT WANTS TO ATTRACT A CERTAIN KIND OF INDUSTRY. WHAT ARE SOME OF THE STEPS IT CAN TAKE TO ATTRACT NEW EXPORT EMPLOYERS?*

Community leaders have encouraged the location of export industries to their locale by establishing industrial parks, offering attractive financial packages, extending utility lines, providing supportive services such as excellent schools and health care facilities, and similar activities.

ASSESSING THE SIZE AND SHAPE OF A COMMUNITY'S TRADE AREA

54. *WHAT IS MOST IMPORTANT IN THE CREATION OF LOCAL JOBS AND INCOME, THE DOLLARS THAT FLOW INTO THE COMMUNITY FROM THE OUTSIDE OR THE MONEY ALREADY IN THE LOCAL ECONOMY?*

Both are equally important. To understand why this is true, let us return to the barrel analogy of the local economy. It is important to keep dollars circulating in the community in order to generate local jobs and income. If the barrel is like a sieve, the economic activity pouring in will have little effect. Those outside dollars leak out if the holes in the sieve are not plugged. Once the dollars leak out, they do the community economy little good. Retailers, service businesses, and suppliers that sell to local citizens and firms help keep dollars circulating locally. Those businesses also supply jobs and income to the community. The important point is the community needs to pursue both avenues in its development effort because neither can exist without the other.

55. *LET US LOOK AT RETAIL AND SERVICE BUSINESSES. IT IS OBVIOUS A COMMUNITY SELLS TO PEOPLE WHO DO NOT LIVE WITHIN THE MUNICIPAL BOUNDARIES SUCH AS FARMERS AND PEOPLE FROM NEARBY AREAS. HOW CAN A VILLAGE OR CITY DETERMINE HOW FAR IT ATTRACTS PEOPLE?*

This really starts to ask what is the community's trade area. A trade area is the geographic area from which the community draws the majority of its retail trade customers. It usually extends beyond the municipal boundaries. The general criteria is that the majority of trade area residents shop in the community.

56. *HOW CAN A COMMUNITY ESTIMATE THE SIZE AND SHAPE OF ITS TRADE AREA?*

One way is to determine how far the subscribers of the local newspaper reside from the community, because newspaper advertising is often important in people's shopping decisions. Another approach is to conduct an area-wide survey of shopping habits, i.e., where people shop and what they purchase. This can be used to develop a map of the trade area. A simple approach is known as Reilly's Law of Retail Gravitation.

57. *WHAT IS REILLY'S LAW?*

Reilly's Law can help a community determine its retail trade boundaries. It is appropriate for shopping goods (furniture, medical services and automobiles etc.), which are the goods and services bought after comparing price, quality, and style. It is less appropriate for convenience goods (groceries, gasoline etc.), which are bought with a minimum amount of comparison. But remember, shoppers come to town for a variety of reasons and often while they are there they will also buy convenience goods.

58. LET ME REPEAT THE QUESTION, WHAT DOES REILLY'S LAW REALLY TELL US?

Reilly's Law gives an estimate of the maximum distance customers travel to shop in a certain community. It can be used by the chamber of commerce or merchant group in a city to find out how far their trade area extends toward a neighboring city. Reilly's Law argues people are attracted to bigger places to do their shopping, but the time/distance they must travel influences their willingness to shop there.

59. WHAT INFORMATION IS NEEDED TO USE REILLY'S LAW?

To use Reilly's Law data is required on: 1) the population of City X and City Y and 2) the road distance between the two places being compared.

60. HOW DO WE USE THIS INFORMATION?

Suppose City X has a population of 8,000 and City Y has 6,000 people. The road distance between the two municipalities is 20 miles. Reilly's Law is represented by this formula:

$$\text{Distance from Smaller Community (Y)} = \frac{\text{Distance between City X and City Y}}{1 + \sqrt{\frac{\text{Population of Larger Community (X)}}{\text{Population of Smaller Community (Y)}}}}$$

If we plug the example numbers into the formula:

$$\frac{20}{1 + \sqrt{\frac{8,000}{6,000}}} = \frac{20}{1 + \sqrt{1.333}} = \frac{20}{1 + 1.155} = \frac{20}{2.155} = 9.28 \text{ miles from City Y.}$$

This means the retail trade area of City Y extends 9.28 miles from City Y towards City X. The result indicates the distance from the smaller community. Consumers who live more than 9.28 miles of City Y are more likely to shop in City X than City Y.

61. HOW CAN REILLY'S LAW BE USED TO DRAW A TRADE AREA?

To use Reilly's Law to outline a trade area requires computing the formula for each nearby community that is competing with the community. Then connect the points dividing the travel distance between communities and create a map ("circle") of the retail trade area. When drawing the map, unique barriers to travel, such as rivers without bridges or major highways that divert traffic, should be considered or the map will be distorted. Another distortion could be institutional in nature, such as school district boundaries or county lines. If such distortions exist, the analyst needs to modify the results of Reilly's Law.

62. AFTER THE RETAIL TRADE AREA MAP IS DRAWN, WHAT DOES THE COMMUNITY DO WITH IT?

The next step is to use census data to gain further insight about the population, income level, age, and other demographic data in the area. These figures are available in the census of population for each township, village, and city located within the trade area. These figures can be used to estimate the market potential for the community.

63. WHAT IF OUR TRADE AREA INCLUDES ONLY A PORTION OF NEARBY MUNICIPALITIES?

It is common for a trade area to include portions of some municipalities. If half a township is located within the trade area, count half of that population and income. Remember, we are only generating an estimate of the true trade area and its characteristics.

64. THIS APPROACH SOUNDS SOMEWHAT ARBITRARY?

Perhaps it does, but then it really is not. Remember, you have identified the distance people are willing to travel to shop in this

community recognizing the physical barriers impeding the flow of traffic. The other portion of the arbitrariness in the estimate is computing the number of people in the trade area. This again is subject to some interpretation and difference of opinion. It is important to remember the purpose is not to provide a precise estimate as much as it is to provide a reasonable estimate of trade area population to be used with other bits of information.

65. *I AM NOT SURE I UNDERSTAND WHAT YOU MEAN?*

Let us take an example. Let Community Y have a trade area that extends 9.28 miles towards Community X, 6 miles toward Community Z, 14 miles toward Community A, and 8 miles towards Community B. This was estimated using Reilly's Law and is displayed on the map in Figure 3.

Note that in the townships where only part of the township was included only part of the population was counted. In Township C if the population was concentrated near Z then the estimate of 15% would be reduced. The "unique" boundary in Township G represents the presence of a large lake and a road system focused on City X rather than City Y.

The grid represents the unincorporated rural townships surrounding City Y. Table 1 indicates how the trade area population could be estimated.

66. *ARE THERE ANY LIMITATIONS IN APPLYING REILLY'S LAW?*

There are several limitations:

1) The population in the comparative communities must be relatively homogeneous from cultural, economic, and social perspectives. For example, Reilly's Law is probably not very useful estimating the boundary between an extremely wealthy and an extremely poor community.

FIGURE 3:

EXAMPLE TRADE AREA

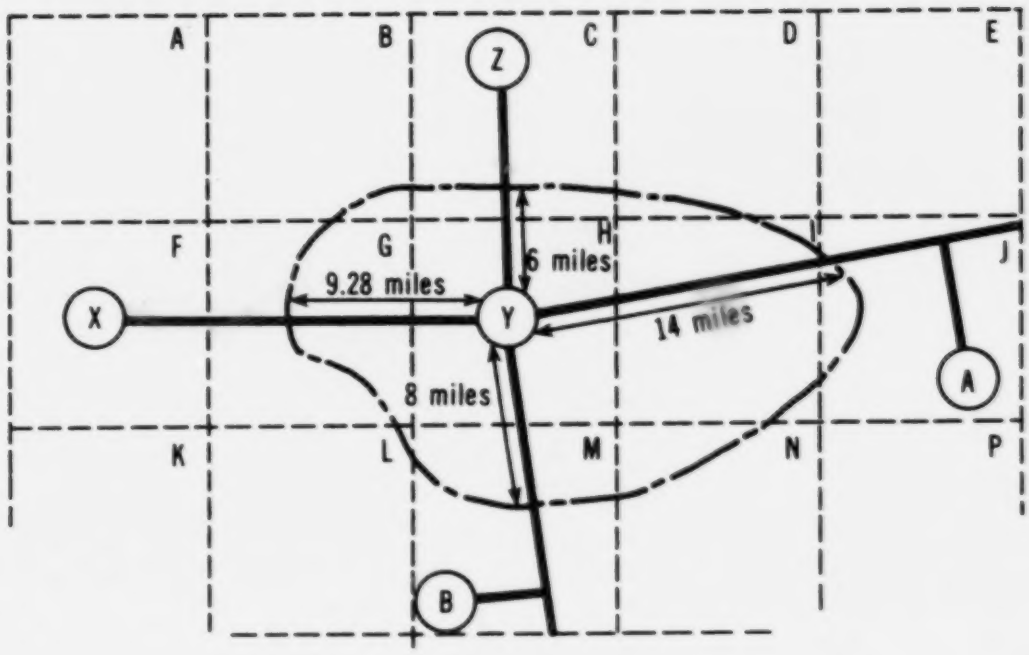


TABLE 1

ESTIMATING TRADE AREA POPULATION

Municipality	Total Population	x	share shopping in City Y	=	City Y Market
Y	6000		100%		6000
A	500		0		0
B	400		10		40
C	300		15		45
D	500		5		25
E	150		0		0
F	1500		0		0
G	1200		60		720
H	800		100		800
I	675		80		540
J	300		5		15
K	770		0		0
L	560		5		28
M	280		10		28
N	415		5		21
P	625		0		0
TOTAL					8262

2) It should not be used to delineate neighborhood trade areas in urban areas. It is better to use Reilly's Law for independent communities surrounded by countryside rather than suburbs or urban neighborhoods.

3) It should be used between similar-sized communities. For example, it should not be used to develop boundaries between a community of 200,000 people and 500 people.

4) It tends to overestimate the shopping population because it assumes that everyone inside the trade area shops locally for locally available goods and services. It does not recognize that local people do some of their shopping outside the community or that some people outside the trade area will sometimes shop in the community rather than always shop in their home community.

5) It should be remembered that all one is estimating is an average trade area boundary. This means some goods or services offered by the community will have larger/smaller trade areas.

In spite of its limitations, Reilly's Law can be very useful. It can help individual merchants, chambers of commerce, and other groups community's trade area.

67. *REILLY'S LAW GIVES US AN IDEA OF THE POTENTIAL RETAIL TRADE AREA AND ITS POPULATION AND INCOME. IS IT POSSIBLE TO FIND OUT HOW MANY CUSTOMERS ARE ACTUALLY DRAWN TO A CERTAIN LOCALE?*

Trade area capture analysis can provide an estimate of the number of customers actually drawn to a community. Trade area capture analysis essentially assumes local people will buy goods and services at the same rate as the state per capita average. The only force causing a variation in spending patterns is income. Trade area capture analysis estimates customer equivalents by dividing actual local sales by the state per capita sales adjusted by relative local income.

$$\text{Trade Area Capture} = \frac{\text{Actual Retail Sales of Merchandise type Y in the Community}}{\text{State Per Capita Expenditures for Merchandise type Y}} \times \frac{\text{Community Per Capita Income}}{\text{State Per Capita Income}}$$

68. WHAT DATA IS NEEDED?

First, one must measure the retail sales for the community and the state. These figures are found in the Census of Business and are published every five years, i.e., 1972, 1977, and 1982. In some states, sales tax data can be used. Private data sources such as Standard Rate and Data or Sales Management are alternative estimates of retail sales volume. These sources generally do not provide information on smaller communities. Per capita income for the county and state are also needed. These are typically available from various state agencies, such as the Department of Administration or Department of Revenue.

69. CAN WE DO AN EXAMPLE?

Let Village Y have $390,000 in furniture sales in 1977. Its 1977 local per capita income was $3,457 and the state per capita income was $4,266. In 1977, state per capita expenditures for furniture were $96.74. Plugging these numbers into the formula you get:

$$\frac{\$390{,}000}{\$96.74 \times \frac{\$3{,}457}{\$4{,}266}} = \frac{390{,}000}{96.74 \times .810} = \frac{390{,}000}{78.35} = 4{,}978$$

The trade area capture for Village Y indicates sales in local furniture stores equaled that of 4,978 people assuming they had purchased furniture at the average rate of all state residents and adjusting for relative income levels. The number is not the actual number of people sold to, but rather represents customer equivalents.

70. CAN YOU HELP WITH THE INTERPRETATION OF THIS NUMBER?

If the trade area capture is larger than the municipal population, the community is attracting consumers from outside its boundaries or local people are spending more for this item than the statewide average. It will require further analysis to determines the cause. If the trade area capture is less than the municipal population, then the community is not capturing the retail/service purchases of its own residents or local residents are spending relatively less than the statewide average.

71. ARE THERE OTHER USES FOR THE TRADE AREA CAPTURE ESTIMATE?

Yes. Remember, this number provides an estimate of the number of people shopped for in the community. One important insight it can provide is the change in customers shopped for over time.

Let us say that the 1982 trade area capture indicates Village Y drew 3,728 furniture customers. The village has lost over 1,250 furniture customers within a five-year period. The village needs to ask itself why this occurred.

72. THE TRADE AREA CAPTURE ESTIMATE INCLUDES RESIDENT CONSUMERS AND THOSE LIVING OUTSIDE THE CITY. IS THERE A WAY FOR A COMMUNITY TO FIND OUT HOW MANY CUSTOMERS IT IS ATTRACTING FROM OUTSIDE ITS BOUNDARIES?

One method to estimate the portion of customers a community draws from outside its municipal boundaries is a ratio called the pull factor. A merchant can look at the change in pull factors over time to determine his/her success in drawing customers from outside the village or city boundaries.

73. HOW ARE PULL FACTORS CALCULATED?

The pull factor, for a certain type of retail good or service, is the trade area capture estimate for that retail good or service divided by the municipal population.

$$\text{Pull Factor for item j} = \frac{\text{Trade Area Capture Estimate for item j}}{\text{Municipal Population}}$$

The division by municipal population removes the influence of population change within a city or village and focuses attention on the community's ability to draw customers from the surrounding area.

74. PLEASE GIVE AN EXAMPLE OF HOW TRADE AREA CAPTURE AND PULL FACTORS ARE USED?

Let us take a community with a 1977 population of 7,821 and 1982 population of 7,833. Sales data are obtained from the 1977 and 1982 Census of Retail Trade. Per capita income information for 1977 and 1982 is gathered from state agencies showning an increase from $3,457 in 1977 to $5,539 in 1982. Table 2 shows that, in spite of a 6.6 percent increase in total retail sales, the community experienced a 1.8 percent decrease in trade area capture. Its sales gain could be from inflation, not from capturing more nonlocal customers.

TABLE 2

EXAMPLE TRADE AREA CAPTURE AND PULL FACTOR ANALYSIS

RETAIL CATEGORY	1977 Actual Sales (000's)	1977 Trade Area Capture	1977 Pull Factor	1982 Actual Sales (000's)	1982 Trade Area Capture	1982 Pull Factor
Hardware, Building Materials, Garden Supply	$ 2,313	19,034	2.43	$ 4,007	28,845	3.68
General Merchandise	3,760	13,577	1.74	1,086	4,004	0.51
Food	5,180	12,441	1.59	5,757	13,244	1.69
Apparel & Accessory	2,298	28,700	3.67	2,662	33,535	4.28
Furn., Home Furnishings, Equipment	2,065	22,599	2.89	1,684	17,471	2.23
Drug and Proprietary	1,338	12,659	1.62	3,216	15,193	1.94
Misc. Retail (Excepting Drug)	2,385	12,659	1.62	3,216	15,193	1.94
Total Retail*	34,676	17,878	2.29	36,970	17,559	2.24

*Includes more items than those listed above.

75. *EXAMINING THE INFORMATION IN THE EXAMPLE, THE TRADE AREA CAPTURE AND PULL FACTORS DO NOT CHANGE IN THE SAME DIRECTION FOR ALL THE SECTORS. WHAT DOES THAT MEAN?*

First, the general decline in the community's pull factor means relatively fewer non-residents are shopping in the community. This could mean there are nearby competing areas or maybe even a general decline in the number of people living in the rural areas outside the community. It will require additional analysis to determine the reason. In terms of the differences in direction of change, it may mean that some local merchants are more vigorous in their marketing, or another store has appeared in the community (increase) or another community (decrease). Trade area capture analysis may stimulate communities to examine reasons why they have lost pulling power, then assess options available to recapture lost retail trade. Furthermore, it can help merchants measure the effectiveness of their promotion and other efforts aimed at capturing market potential.

76. *I SENSE YOU ARE NOT TELLING ME ANYTHING I DO NOT ALREADY KNOW?*

It may seem that way, but often times a community may think it is being hurt by a nearby competitor when the data show both have gained. This analysis may confirm existing suspicions or deny rumors. It cannot give you a final answer.

77. *ARE THERE ANY LIMITATIONS OF TRADE AREA CAPTURE AND PULL FACTORS?*

They are used mainly for comparison purposes to help communities to assess growth or decline. However, these tools do not tell us why the growth or decline occurred or what to do to alter the situation. The community needs to conduct further analysis after they have used the pull factors and trade area capture. Another limitation is there is no definite

standard for a community to judge whether it has a "good" or "bad" pull factor or trade area capture because these tools were only intended for comparative purposes.

KEEPING LOCAL DOLLARS IN THE COMMUNITY

78. *TRADE AREA CAPTURE, PULL FACTOR, AND RETAIL TRADE BOUNDARIES POINT TO THE ABILITY OF THE COMMUNITY TO CAPTURE DOLLARS. HOW CAN A COMMUNITY IMPROVE ITS CAPACITY TO KEEP LOCAL DOLLARS?*

If the community wishes to improve its capacity to attract local dollars, it should focus its efforts on the trade and services sector. In some cases, a merchant group may need to be activated to address the problem. In other cases, action may require education, better marketing or the development of special financial packages for retailers. Each community will have a distinct approach reflecting local conditions in addressing its ability to capture local dollars.

A partial list of things that can be done includes:

- Identify market potential of retail outlets through survey of consumer needs and buying habits.
- Improve share of retail market captured through a downtown analysis and renewal through consumer and merchant surveys.
- Aid employers in developing employee training programs to improve quality of service.
- Expand purchases by nonlocal people (tourists, neighboring citizens) through appropriate advertising.
- Encourage local citizens and businesses to buy locally through informational programs about locally available goods and services.

- Take collective action through the formation of organizations such as downtown revitalization groups or chambers of commerce.

79. *HOW CAN A COMMUNITY TELL IF IT IS LOSING TRADE DOLLARS?*

The first step is to examine the change in trade area capture and pull factors. The second is to estimate sales potential and compare it with the actual sales. If actual sales are less than potential, then the community is losing some sales. If possible, two different times should be used to determine the direction of change.

80. *HOW DOES THAT WORK?*

Let us say that, Community Y has a population of 7833 people and a local per capita income of $5539. The trade area population is estimated as 24,000 people. The state income averages $6864 per person and furniture sales are $98.61 per person.

The potential furniture sales are computed from the following formula:

$$\text{Potential Sales} = \text{Trade Area Population} \times \text{State sales Per capita} \times \frac{\text{Local per capita income}}{\text{State per capita income}}$$

Inserting the data from the example in the formula yields:

$$\$1,909,793 = 24,000 \times \$98.61 \times \frac{\$5539}{\$6864}$$

This is the potential furniture sales in this community if trade area residents spend at the same rate as the statewide average and adjusting for relative per capita income.

81. HOW DO I DETERMINE THE PERCENT OF TRADE POTENTIAL BEING CAPTURED?

This is done by dividing actual sales collected by the Census of Business by potential sales. In Table 2, the actual 1982 furniture sales were $1,684,000. In this example, the community is capturing only 88.2% of its potential furniture sales:

$$88.2\% = \frac{\$1,684,000}{\$1,909,793}$$

82. THAT SEEMS APPROPRIATE IF SALES DATA IS AVAILABLE. WHAT IF IT IS NOT?

If sales data is not available, then another indicator must be used. Actual sales data is difficult to obtain in smaller communities. In very small communities, it may be possible to interview individual stores and acquire an estimate of actual sales. In some states, sales tax information is sufficiently good; it permits identifying the sales of particular types of businesses in specific locales. Or finally it may be possible to count the number of workers in particular retail and service establishments. If they are assumed to produce sales equal to a per employee average for the state or similar community it would allow an estimate of local sales.

83. WE HAVE DISCUSSED SALES POTENTIAL AND ACTUAL SALES. ARE THERE OTHER TECHNIQUES TO ESTIMATE SALES POTENTIAL OR EVEN OTHER TYPES OF RETAIL AND SERVICE ACTIVITIES THAT MIGHT BE FEASIBLE IN THE COMMUNITY?

Yes. Three other techniques that might yield some insight are location quotients, population-employment ratios, and demand thresholds.

84. WHAT DO LOCATION QUOTIENTS TELL ME?

Location quotients can indicate if a community produces more than is needed for its own use and is selling the excess to non-local markets. It

can also tell us which types of business are not accommodating local needs and are a source of consumption leakage.

85. HOW DO LOCATION QUOTIENTS GIVE THAT INFORMATION?

The location quotient approach assumes the national economy is self-sufficient. While that is not completely true, it is more appropriate to make that assumption for the national economy than a state, multi-state, or multi-county economy. The local economy is compared against that standard of self-sufficiency. If the local economy has relatively less economic activity in a particular sector, that suggests the good or service is being imported from other communities. If the local economy has relatively more economic activity in a particular sector, that suggests the good or service is being exported to other communities.

86. HOW ARE LOCATION QUOTIENTS CALCULATED?

First, determine the percentage of local employment in a particular sector or activity. Then, calculate the percentage of national employment in that same sector or activity. The third step involves dividing the percentage of local employment in a given activity by the percentage of national employment in that same activity. This equation determines the location quotient:

$$\text{Location Quotient} = \frac{\text{\% of Local Employment in Activity X.}}{\text{\% of National Employment in Activity X.}}$$

87. HOW IS THE LOCATION QUOTIENT INTERPRETED?

The location quotient provides information for two important conditions. A location quotient greater than one (1) indicates the sector is an export activity and is an important link to the outside economy (see discussion of employment multipliers). It is important to recognize,

however, that a location quotient probably needs to exceed 1.25 before it represents much export activity. The second important value is a location quotient less than one (1), particularly .75 or less. It suggests that particular sector is not meeting local needs. The use of the range .75 to 1.25 is recognition of data imperfections. The minimum and maximum number essentially tries to restrict the analysis to those sectors that are "extremes."

88. *AFTER A LOCATION QUOTIENT HAS BEEN CALCULATED, HOW CAN IT BE USED FOR COMMUNITY ECONOMIC ANALYSIS?*

One has to be careful in making hasty conclusions from location quotients. For example, a location quotient less than one does not mean the community should strive for self-sufficiency in that activity. Each community need not be completely self-sufficient in all sectors, e.g., steel mills or shoe manufacturers. However, if the location quotient is less than one in a trade or service activity, it suggests there may be a gap in the local economy, because most trade and service activities are expected to be present in most cities and villages.

88. *THAT INDICATES ONE HAS TO USE A SENSE OF JUDGEMENT WHEN INTERPRETING LOCATION QUOTIENTS. WHAT KINDS OF QUESTIONS SHOULD A COMMUNITY ASK ITSELF TO INTERPRET ITS LOCATION QUOTIENTS?*

To a large extent that judgement is based on the question, "Is it feasible to have this type of trade or service activity in this particular community?" If the answer is yes, there are several additional items to consider.

90. WHEN IS THAT QUESTION LEGITIMATE?

The community can compare its location quotient with the location quotient of similar communities. If those communities are exporting (LQ>1) or are at least self-sufficient (LQ=1) in this sector, that reinforces the idea the community could expand that sector.

Remember, the location quotient is only a first cut at possible activities. The real answer comes from a feasibility study. Such studies give information about potential customers, the anticipated profitability of a particular business, and offer more conclusive information about the possibility of expansion in a certain activity. People, who understand marketing, can conduct such studies. But it is senseless to spend a great deal of money and time on a feasibility study unless one first calculates the location quotients, compares them to similar communities, and calculates the population-employment ratios (to be discussed later) to narrow the possibilities.

91. WHAT TYPE OF INFORMATION IS NEEDED TO COMPUTE LOCATION QUOTIENTS?

Employment data by sector of the local and national economy. Generally, this is just wage and salary employment and does not include proprietors.

92. LOCATION QUOTIENTS SEEM TO BE FAIRLY EASY TO CALCULATE. ARE THERE SOME CAUTIONS IN THEIR USE?

Just like any other tool, location quotients need to be used with caution because some elemental assumptions can lead to errors, if they are violated. The technique requires you to assume local and non-local demand and productivity are similar.

93. WHY IS THIS SO IMPORTANT?

Remember, we are trying to identify economic opportunities. If the local economy has a local demand that varies substantially from the national conditions then the level of self-sufficiency may be quite different from that implied. For example, the local community is growing and has a relatively large share of its employment in residential housing construction because the community is experiencing a housing boom, not because it is exporting houses to other locales. Productivity is also important because if the local workforce is less productive than the national average, then relatively more people need to be employed to just meet local needs. In this case, the relatively high share of local employment in a particular sector reflects poor management or workers who do not produce at a comparable rate to the national average. Yet, the location quotient would suggest they are exporting.

94. ARE THERE ANY OTHER LIMITATIONS OF LOCATION QUOTIENTS?

Another caution is the aggregation of the data, location quotient values can vary because of the data used. For example, Standard Industrial Code (SIC) 37 is transportation equipment manufacturing while SIC code 3732 represents the manufacturing of pleasure boats. A community may have a location quotient of less than one at the two-digit level, which suggests no exports. But if the data were broken down to the four-digit SIC code level, the production of pleasure boats, the location quotient would indicate the community is an exporter.

Although the ideal is to use three- or four-digit SIC codes for calculating location quotient, its not always feasible. Most employment data for communities is only available at the two-digit level, so finding more precise data may not be feasible.

95. ARE THERE OTHER MEASURES A COMMUNITY CAN USE TO UNDERSTAND ITS TRADE AND SERVICE SECTORS?

There is the population-employment ratio. It measures the number of people in the local market who support each trade or service job. It is a simple ratio to make inter-community comparisons of trade and service activities. These ratios are relative and vary by size of the community.

96. WHAT DO YOU MEAN RELATIVE?

Location quotients have a critical value of one (1). Population-employment ratios have no single critical value. Rather, the critical value is the average of several similar-sized communities. A population-employment ratio larger than the average indicates each local worker is selling to more customers than the average for similar-sized communities. This suggests there may be an opportunity to expand employment in this trade or service activity.

97. WHAT INFORMATION DO WE GET FROM POPULATION-EMPLOYMENT RATIOS THAT LOCATION QUOTIENTS DO NOT TELL US?

Population-employment ratios use the entire population which includes all consumers not just those who are working as location quotients do. Thus, for communities with either a lot of younger people and/or older people, who are not working, the location quotient may yield biased results.

98. HOW ARE POPULATION-EMPLOYMENT RATIOS CALCULATED?

First, the data required is the population of the cities being compared and the number of employees in a particular trade or service activity in each city. The population-employment ratio for each city is

determined by dividing the population in each city by the employment in a particular trade or service activity:

$$\text{Population-employment ratio} = \frac{\text{Population of a City}}{\text{Number of Employees in a Particular Trade or Service activity in that City.}}$$

99. COULD YOU SHARE AN EXAMPLE?

Suppose there are five small cities with populations between 6,000 and 9,000. Each city is the county seat, none contains a sizeable federal or state employer and none is closely linked to a major metropolitan center. Let us say the sector for comparison is furniture retailing, SIC code 57.

Suppose the population-employment ratios for the five cities are as follows: City A, 250; City B, 249; City C, 350; City D, 193; City E, 549. The average ratio for these five cities is 314. This suggests cities A, B, and D have more than the average number of employees in furniture retailing relative to their population while cities C and E have less. City E's relatively high ratio indicates it may have expansion opportunities in furniture retailing. Yet, before making a final judgement on expanded furniture retailing, it is important to examine other obvious factors not captured in the employment data.

100. SUCH AS?

The most obvious is a nearby community with an obviously aggressive merchant, which would make it more difficult to operate or start a firm successfully. Second, the assumptions of similar demand and productivity among communities may not be valid. Just like location quotients, if demand or productivity are not similar it requires further analysis, because one cannot be sure what the data show.

101. DO THE POPULATION EMPLOYMENT RATIO AND THE LOCATION QUOTIENT GIVE US THE SAME INFORMATION?

They are similar, but not duplicative. A relatively high population-employment ratio and a location quotient less than one suggest an expansion possibility. A relatively low population- employment ratio and a high location quotient suggest expansion possibilities are limited. Other combinations of location quotients and population-employment ratios require additional analysis before you can make a judgement.

102. IF WE ARE LOOKING AT THE MARKET SUPPORTING A PARTICULAR TRADE OR SERVICE WORKER SHOULD WE NOT USE THE TRADE AREA RATHER THAN MUNICIPAL POPULATION?

To be correct, you probably should. But then, you need to include all the workers in that particular activity in the smaller communities in your trade area. This would need to be done for all the comparison communities. Furthermore, the trade area for different goods and services vary so the market population also varies. It is questionable whether it is worth the additional trouble. Again, remember no single number will be sufficient to make a decision.

103. YOU MENTIONED DEMAND THRESHOLDS COULD BE USED TO JUDGE THE POTENTIAL FOR PARTICULAR TYPES OF RETAIL AND SERVICE ACTIVITIES.

That is true to some degree. Demand thresholds are estimates of the average number of people found in a community with a given number of a particular establishment.

104. JUST WHAT DOES THAT MEAN?

Let us say a community of 2700 people would like to have a shoe store. A demand threshold estimate might indicate on the average a shoe store is not found in communities of less than 3000 people. This means that an

average size shoe store is not likely to have a sufficient local market to support its operation. But remember averages and general rules of thumb have almost as many exceptions as accurate predictions.

105. ARE YOU SAYING THAT DEMAND THRESHOLDS MAY BE MISLEADING?

Any of the techniques discussed in this manual can yield misleading results if not used with care and some sensitivity to other sources of information and insight.

106. RECOGNIZING THOSE LIMITATIONS, ARE THERE SOME GENERAL ESTIMATES OF DEMAND THRESHOLDS THAT ARE APPLICABLE IN MOST COMMUNITIES?

Yes there are, but the value of the estimate will change over time and among different areas of the country. Thus, there are no general numbers appropriate in every community. Often the best source of market/demand threshold information for a specific type of business, e.g., hardware store, pharmacy etc. is to make contact with that trade association and ask them about some general market needs for a successful operation.

MEASURING THE EFFICIENCY OF LOCAL FIRMS

107. THESE TOOLS GIVE SOME IDEA ABOUT EXAMINING THE TRADE OR SERVICE SECTOR. ARE THERE OTHER WAYS A COMMUNITY CAN ADDRESS THE QUESTION OF COMMUNITY ECONOMIC DEVELOPMENT?

Yes, there are. It is important to remember there are no distinct divisions among these approaches. Another approach is to examine the efficiency of firms.

108. WHY EXAMINE EFFICIENCY OF FIRMS?

A key mechanism for community economic development is to work with existing businesses to improve their efficiency and competitiveness. This helps the community because, if existing businesses become more competitive, they will be more viable and are more likely to generate employment opportunities.

109. HOW CAN A COMMUNITY TELL IF ITS BUSINESSES ARE MORE COMPETITIVE THAN OTHERS?

One way to examine the competitiveness of local business would be to look at the forces affecting their growth or decline. These forces of change can come from three sources. The first is local growth (decline) stimulated by national growth (decline). The second is local growth (decline) stimulated because of a local concentration of businesses in relatively faster (slower) growth economic sectors. The third is local growth (decline) arising from more (less) competitive firms locally than the national average for that sector.

110. CAN THE IMPACT OF THESE THREE FACTORS ON THE LOCAL COMMUNITY BE ESTIMATED?

Shift-share analysis can provide some insight to the magnitude of these factors. It is a descriptive tool and does not indicate why employment changed. Rather, it is starting point for further analysis.

111. WHAT IS SHIFT-SHARE ANALYSIS?

It measures the movement (shift) of the local economy into faster or slower growth sectors and the community's larger or smaller portion (share) of the growth occurring in a given economic sector.

112. HOW DO YOU CALCULATE SHIFT-SHARE ANALYSIS?

The first step is to calculate the national growth component (NG). It measures the potential change in local employment assuming the local economy is similar to the national economy. The national growth component is calculated by multiplying the base year employment in each sector by the national average employment growth rate, and then summing over all the sectors. The results show how many new jobs were created locally due to national economic trends, assuming the local and national economy are identical.

113. HOW CAN A COMMUNITY MEASURE WHETHER IT HAS MORE/FEWER FASTER GROWTH BUSINESSES THAN THE NATIONAL AVERAGE?

The second step in shift-share is to compute the industrial mix component (IM). The industrial mix component is determined by multiplying the local employment in each economic sector by the difference in the national growth rate for that sector and the growth rate for the whole economy. A positive industrial mix indicates the majority of local employment is in sectors growing faster than national total employment. A negative industrial mix indicates just the opposite.

114. WHAT MIGHT CAUSE THE SLOWER GROWTH?

There are several reasons for a negative IM. The community may have businesses with declining long-run growth prospects. It may also indicate businesses are undergoing a cyclic downturn. It could also be due to poor management, obsolete technology or a shift in markets.

The community needs to examine both the total industrial mix as well as the industrial mix for specific sectors. The community could ask businesses in negative sectors what kinds of assistance they might need.

If the community wants to stimulate internal growth, it needs to consider both positive and negative industrial mix businesses. But just as importantly, sectors with a positive or negative industrial mix generally require different responses from the community.

115. *HOW CAN A COMMUNITY MEASURE WHETHER LOCAL BUSINESSES ARE GROWING FASTER OR SLOWER THAN SIMILAR BUSINESSES NATIONALLY?*

The competitive share component (CS) measures the ability of the local economy to capture an increasing (decreasing) share of a particular sector's growth. It is computed by multiplying the local employment in each economic sector by the difference in the growth rate of that sector nationally and locally. After doing this for all sectors, the results are summed to give the community competitive share.

A positive competitive share indicates the community gained additional jobs over that due to national growth and its industrial structure. This gain suggests the community is more competitive (efficient) in securing additional employment than the rest of the nation. It is important to examine the competitive share for both the community and particular sectors. Each yields different information.

116. *COULD WE GO THROUGH A SIMPLE EXAMPLE OF SHIFT-SHARE ANALYSIS?*

Let us assume that the national employment grew at a rate of 5 percent over the last two years and nationally sector A grew 7 percent and sector B 4 percent. In the community, total employment grew 5.6 percent and sectors A and B grew 6 percent and 5 percent respectively. The initial local employment in these two sectors was 200 and 120. The national growth component is calculated as:

Sector	Base Employment		National Growth rate	=
A	200	x	5%	= 10
B	120	x	5%	= 6
National Growth Component				16

The industrial mix component is calculated as:

Sector	Base Employment		Sector Growth Rate		National Average Growth Rate	=
A	200	x	(7%	-	5%)	= 4.0
B	120	x	(4%	-	5%)	= -1.2
Industrial Mix Component						2.8

The competitive share component is calculated as:

Sector	Base Employment		Local Sector Growth Rate		National Sector Growth Rate	=
A	200	x	(6%	-	7%)	= -2.0
B	120	x	(5%	-	4%)	= 1.2
Competitive Share Component						- .8

This community gained 18 new jobs over the last two years. Most of that gain (16 jobs) was due to national economic growth. The majority of local employment is in relatively fast growing sectors because the community has a positive industrial mix (2.8 jobs). But these sectors are not very competitive compared to national standards (a competitive share loss of .8 jobs). Note that sector B had a positive competitive share that was offset by the negative competitive share in sector A. This suggests the community needs to determine how it can support sector B's continued competitive position and help sector A improve its competitive prospects. Likewise, the community must recognize that sector B is currently growing slower than the national average. This may be due to business cycles or shifts in demand, etc.

117. WHERE DO YOU GET DATA TO COMPUTE THE NATIONAL GROWTH COMPONENT, INDUSTRIAL MIX, AND COMPETITIVE SHARE?

The data can be acquired from County Business Patterns, which is published annually. The data also is available from the state Job Service of the state Department of Labor.

118. SUPPOSE SHIFT-SHARE ANALYSIS SUGGESTS SOME LOCAL BUSINESSES ARE NOT AS EFFICIENT AS THEY COULD BE. HOW CAN A COMMUNITY IMPROVE THE EFFICIENCY OF ITS EXISTING FIRMS?

Again there is no single avenue to success, but the community could:

1. Strengthen management capacities of existing firms through educational programs (personnel, finance, organization, etc.).

2. Encourage business growth through identification of capital sources:

   a. Loans (S.B.A., banks, industrial revenue bonding)

   b. Equity (small business investment corporations, investment groups)

3. Increase knowledge of new technology through educational programs in science and engineering.

4. Aid employers in improving work force quality through educational programs, employment counseling, and social services, e.g., day care, health services.

5. Develop community and regional facilities, which improve local business efficiency and access to nonlocal markets, e.g., transportation, services, communications.

OTHER STRATEGIES

119. *ANOTHER IMPORTANT ASPECT OF COMMUNITY ECONOMIC DEVELOPMENT IS THE CREATION OF NEW FIRMS. WHAT STEPS CAN A COMMUNITY TAKE TO ENCOURAGE THE FORMATION OF NEW FIRMS AND WHY IS IT SO IMPORTANT?*

There is a continuing need for new businesses to meet changing needs. The rapid growth of the fast food industry for example, indicates how consumers' preferences have changed. The computer service industry sprang from a change in technologies. Population growth and shifts can also lead to business expansion.

A community economic development program should encourage entrepreneurs to form businesses, which have a good chance of success. Assistance can be provided through management counseling, packaging necessary capital, and other mechanisms.

120. *ANOTHER OPPORTUNITY FOR IMPROVING COMMUNITY INCOME AND EMPLOYMENT IS TO INCREASE AIDS RECEIVED FROM BROADER UNITS OF GOVERNMENT. WHY IS IT SO IMPORTANT?*

A significant portion of many communities' income comes from payment received from broader units of government, such as counties, states, and the nation. Individuals receive payments such as social security, veterans' benefits, aids for dependent children, and retirement income. (See discussion of employment multipliers.) Businesses receive agricultural land conservation assistance, military equipment, and service contracts. Local governments receive aids for schools, park and recreational development, streets, and other things.

121. WE HAVE LOOKED AT MANY DIFFERENT TOOLS OF COMMUNITY ECONOMIC ANALYSIS. ARE THERE ANY OTHER TOOLS THAT SHOULD BE CONSIDERED?

This manual is not exhaustive. We have only explored some of the tools for economic analysis. Some tools are too costly, or use data that is difficult to find. For example, a community economic analysis technique, not discussed in this manual, is input-output analysis. This manual also did not explore descriptive data that can tell us a great deal about a particular community. The worth of such data is obvious and self-explanatory. However, this manual's primary focus is on economic analysis tools that will be helpful to community economic developers. Interested readers are referred to the bibliography for more detail.

122. THIS MANUAL MAKES AN ARGUMENT THAT A COMMUNITY CAN LEARN MORE ABOUT ITS ECONOMY THROUGH COMMUNITY ECONOMIC ANALYSIS. BUT HOW CAN WE MAKE SURE THE ANALYSIS LEADS TO ACTION AND IS NOT FORGOTTEN?

There is no guarantee that analysis will lead to action. However, the chances for action are increased considerably if local leaders and citizens are involved in the early stages of analysis and are given the opportunity to ask questions, to learn how to calculate and interpret the tools, to identify problem areas, and to set achievable goals.

APPENDIX

HYPOTHETICAL CASE EXAMPLE USING COMMUNITY ECONOMIC ANALYSES TOOLS

REILLY'S LAW

Purpose

To determine the maximum distance customers will travel to shop in a certain community. The information is generally used to develop a trade area map of the community.

Example

We want to know how far the trade area extends from the City of Riverside to the cities of Mountainview, Centerville, River Falls and Forest Grove.

Data Needed

1. Population of each city to be compared with our community, e.g., Riverside. Each state generally makes annual estimates of community population for various official purposes. Contact the local community or call a state office, such as the administration department or the sociology department of a nearby university for this information.
2. The road distance from our community, e.g., Riverside to similar cities surrounding it, e.g., Mountainview, etc. The distance between communities can be read from road maps.

Cities	Population	Distance from Riverside (miles)
Riverside	7,052	0
Mountainview	3,260	23
Centerville	18,023	61
River Falls	3,346	31
Forest Grove	6,758	17

Reilly's Law Formula

$$\text{Distance from Smaller community} = \frac{\text{Distance between City X and City Y}}{1 + \frac{\text{Population of larger municipality}}{\text{Population of smaller municipality}}}$$

How to Calculate Trade Area Boundaries:

Compute the boundary between Riverside and Mountainview by plugging the numbers into the formula.

$$\frac{23}{1 + \sqrt{\frac{7,052}{3,260}}} = \frac{23}{1 + \sqrt{2.163}} = \frac{23}{1 + 1.47} = 9.31 \text{ miles from Mountainview}$$

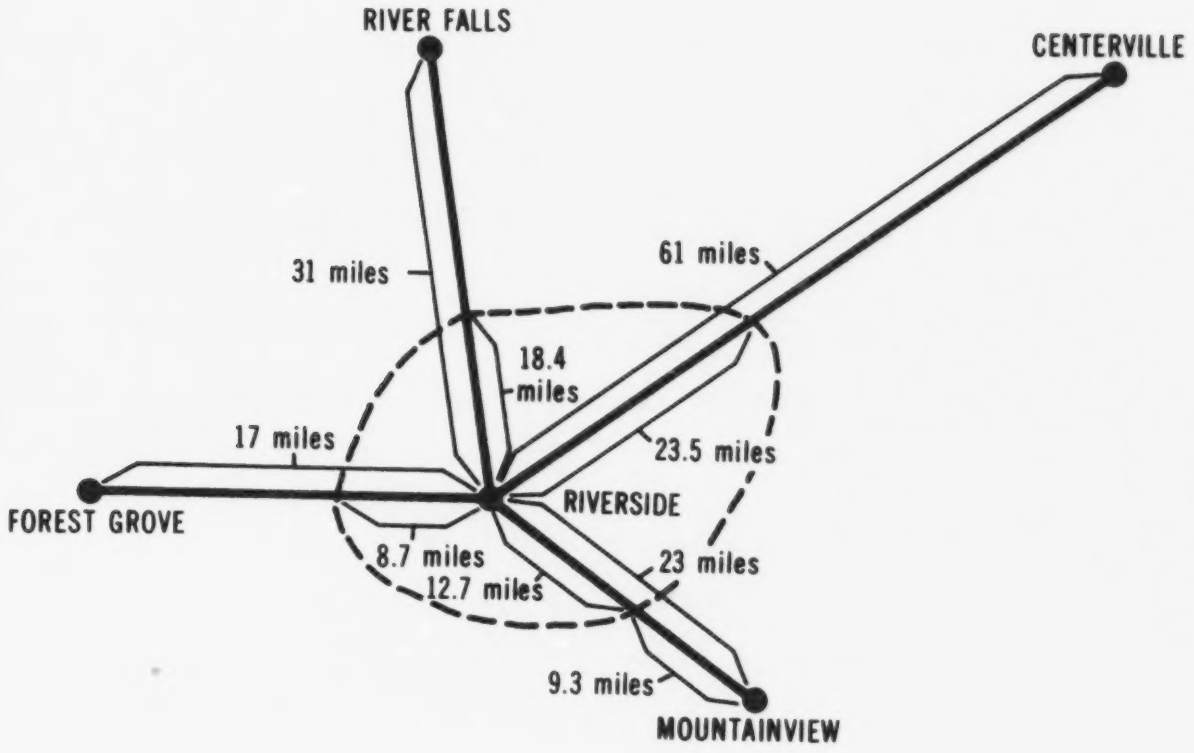
Compare Riverside and Centerville by using the same formula:

$$\frac{61}{1 + \sqrt{\frac{18,023}{7,052}}} = \frac{61}{1 + \sqrt{2.555}} \quad \frac{61}{1+1.60} = 23.47 \text{ miles from Riverside}$$

Interpretation

The Riverside-Mountainview result means the trade area for Riverside extends up to 9.31 miles from Mountainview. The people, who live within 9.31 miles of Mountainview, will be reluctant to shop in Riverside. The Riverside-Centerville comparison suggests that the trade area for Riverside extends up to 23.47 miles from the City of Riverside. Remember, the final number derived in the formula is the trade area boundary distance from the smaller community. After calculating the trade area distances for surrounding communities, connect the points. This yields a map of the trade area.

The Riverside trade area map: [not drawn to scale]



After the trade area has been identified the population, income, and other information about municipalities within the trade area can be used to help Riverside merchants to understand their trade potential.

TRADE AREA CAPTURE

Purpose

To tell how many customers are drawn to a particular community to shop for a certain type of product at any given time.

Example

The City of Riverside wants to know how many customers it has attracted in recent years. Riverside is especially interested in its auto dealers. They want to know if they lost or attracted more customers between 1977 and 1982.

Data Needed

1. Actual retail sales in a particular sector, i.e., Riverside auto sales in 1977 and 1982. The retail sales for the community and the state are located in the Census of Business. This information is published every five years, i.e., 1972, 1977 and 1982. If you are analyzing a community larger than 2,500 people, you can obtain up-to-date retail sales information from private sources such as Standard Rate and Data or Sales Management. These are often available in newspaper offices, larger retail firms or libraries in universities, and business colleges. In some states, sales tax data can be used. This can be obtained from the appropriate state agency.
2. State per capita expenditures in that particular sector, i.e., state auto sales in 1977 and 1982.
3. County per capita income for the years being analyzed, i.e., for 1977 and 1982. Per capita income is available from various state agencies such as the Department of Revenue or Department of Administration or

Census of Population or Bureau of Economic Analysis Regional Economic Information Program.

4. State per capita income for same years as local income, i.e., for 1977 and 1982.

How to Calculate Trade Area Capture

$$\text{Trade Area Capture} = \frac{\text{Actual Retail Sales of merchandise type J}}{\text{State Per Capita Expenditures for Merchandise type J}} \times \frac{\text{County Per Capita Income}}{\text{State Per Capita Income}}$$

The trade area capture for Riverside auto sales in 1977

$$= \frac{\$3,301,000}{\$390.12 \times \frac{\$3,457}{\$4,266}} = \frac{3,301,000}{390.12 \times .810}$$

$$= \frac{3,301,000}{315.99} = 10,446$$

Trade area capture for Riverside auto sales in 1982

$$= \frac{\$9,341,000}{\$655.61 \times \frac{\$5,539}{\$6,864}} = \frac{9,341,000}{655.51 \times .806}$$

$$= \frac{9,341,000}{528.34} = 17,680 = 17,680$$

Interpretation

The 1977 figure means Riverside "captured" the auto purchases of 10,446 people. It does not mean they sold 10,446 cars. For example, if a family of five people purchased a car, they would be listed as five people in the trade area capture figure. The 1982 figure indicates Riverside served 17,680 auto customers. An increase of 7,234 people means Riverside has improved its ability to capture auto customers. Why did this occur? Could Riverside increase its auto customers more in the next five-year period? These are some of the questions the community might ask itself.

The trade area capture analysis can also be used for other retail sectors to understand community trade growth or decline. Below, the trade area capture for eating and drinking establishments and miscellaneous retail indicates there has been a loss in customers. Why did it occur? What can Riverside do to promote those two sectors? These are some of the questions that follow trade area capture analysis.

	1977		1982	
Retail Category	Actual Sales (000s)	Trade Area Capture	Actual Sales (000s)	Trade Area Capture
Food	5,122	14,320	9,241	17,203
Auto	3,301	10,446	9,341	17,680
Furniture	1,527	19,489	2,603	21,922
Eating and Drinking	2,187	12,962	2,889	10,885
Miscellaneous Retail	1,300	7,399	1,599	6,113
Total Retail*	22,505	13,500	37,971	15,270

*Includes categories not explicitly identified.

PULL FACTOR

Purpose

To determine the portion of customers a community draws from outside its boundaries. Pull factors should be compared over several time periods to determine trends. While not a general occurrence, the pull factor could be less than one.

Example

The City of Riverside wants to know what portion of its automobile customers are coming from outside its boundaries. They are interested if they have improved on their ability to attract outsiders between the years 1977 and 1982.

Data Needed

1. Trade area capture for a particular sector for two time periods, i.e., Riverside auto sales trade area capture for 1977 and 1982.
2. Population of the community, i.e., Riverside population in 1977 and 1982. Annual estimates of the community population are available from the local library, city hall, or a state agency such as the Department of Administration or Department of Revenue.

How to Calculate Pull Factors

To calculate a pull factor for a certain type of retail good, divide the trade area capture estimate by the community population for the same year as the trade area estimate:

$$\text{Pull Factor} = \frac{\text{Trade Area Capture Estimate}}{\text{Community Population}}$$

Riverside's population was 6,545 in 1977 and 7,065 in 1982. Its trade area capture for auto sales was 10,446 in 1977 and 17,680 in 1982.

$$\text{1977 Riverside Auto Sales Pull Factor} = \frac{10,446}{6,545} = 1.50$$

$$\text{1982 Riverside Auto Sales Pull Factor} = \frac{17,680}{7,065} = 2.50$$

Interpretation

Strictly interpreting a pull factor of one (1) it means the community is drawing all its customers from within its boundaries but none from the outside. A pull factor of 1.5 for 1977 Riverside auto sales means Riverside drew some customers from beyond the municipal boundaries. The proportion of non-local customers was equal to 50 percent of the Riverside population.

The 1982 Riverside auto sales pull factor is 2.5. It means the city attracted outside purchases equal to 150 percent of the Riverside population. Thus, the city drew 10,598 customers from outside its boundaries and 7,065 customers from within the city limits.

The 1977 and 1982 pull factors of 1.5 and 2.5, respectively, indicate the community improved its ability to attract outsiders. Riverside needs to ask itself why this occurred. It should also ask similar questions if the pull factor declines.

A pull factor less than one suggests the community is not even capturing the shoppers within its municipal boundaries or they are spending relatively less than the state average.

POTENTIAL SALES

Purpose

To estimate the potential sales volume for a particular retail or service activity in the trade area.

Example

The City of Riverside wants to determine what proportion of potential new auto purchases it actually is capturing.

Data Needed

1. Actual retail/service sales for a particular activity is collected from the Census of Retail Trade or Selected Services for selected years or possibly from sales tax data.

2. Trade area population is estimated from Reilly's Law and the Census of Population.

3. State average expenditures per person for a particular retail/service activity can be collected from the appropriate Census of Business or sales tax data.

4. State and local per capita income data can be collected from Bureau of Economic Analysis data or state income tax data or Census of Population.

Calculating Sales Potential

The formula is

$$\text{Potential Sales} = \text{Trade Area Population} \times \text{State Per Capital Sales} \times \frac{\text{Local Per Capita Income}}{\text{State Per Capita Income}}$$

For the City of Riverside, the following data is used in the above formula: trade area population, 22,500; local per capita income, $5,539; state per capita income, $6,864; and state per capita auto sales, $655.61.

$$\$11,903,704 = 22,500 \times \$655.61 \times \frac{\$5,539}{\$6,864}$$

The proportion of potential sales that are captured are:

$$78.5\% = \frac{\$9,341,000}{\$11,903,704}$$

Interpretation

The City of Riverside is capturing only 78.5 percent of its estimated potential sales in new automobile purchases. This could be due to a variety of reasons including non-aggressive local businesses, nearby competition, poor choice, and product selection etc. Note these numbers tend to support the insight gained from trade area capture, which indicated that the city was capturing only 17,680 customers out of the 22,500 in the trade area.

LOCATION QUOTIENT

Purpose

1. To determine a community's degree of self-sufficiency in a particular retail or trade sector.
2. To determine if a community is losing its local trade dollars to non-local markets.
3. To determine if a community is producing more than needed for its own use and is selling the excess to nonlocal markets, i.e., identify export activity.

Example

Business leaders in Riverside want to know if the community is self-sufficient in apparel and accessory stores.

Data Needed

1. The Standard Industrial Classification (SIC) Code for Sector J, i.e., apparel and accessory stores. First, define the type of business to be investigated in terms of its Standard Industrial Classification (SIC) Code. These codes are published by the U.S. Department of Commerce and Labor. The local Job Service is likely to have a copy. Generally, three-digit SIC codes should be used to determine location quotients but usually is unavailable in smaller communities.
2. The percentage of local labor force employed in Sector J, e.g., apparel and accessory stores. This percentage is determined by dividing the number of local people employed in Sector J by the total local employment. This employment information is available from the Job Service or Department of

Labor or County Business Patterns. It is categorized in terms of SIC codes.

3. The percentage of workers employed nationally in Sector J, e.g., apparel and accessory stores. This information is available through Job Service or the state Department of Labor. Another source is the Employment and Earnings report published by the U.S. Bureau of Labor Statistics. County Business Patterns is also a potential source for state or national data.

How to Calculate Location Quotients

Location quotients are calculated by dividing the percentage of those employed locally in a particular sector by the percentage of those employed in the same sector nationally.

$$\text{Location Quotient} = \frac{\text{\% of Local Employment in Sector J}}{\text{\% of National Employment in Sector J}}$$

Looking at Riverside again, the Standard Industrial Classification (SIC) code for retail apparel and accessories is 56. In 1982, 1.38 percent of national employment is found in SIC code 56. Riverside has 1.29 percent of its 1982 employment in SIC 56. The apparel and accessory location quotient for Riverside is:

$$\frac{1.29}{1.38} = .94$$

Interpretation

A location quotient of .94 for Riverside's apparel and accessory shops is almost one. It suggests the city is approximately self-sufficient in apparel and accessory shops. A location quotient generally between the values of .75 and 1.25 probably indicates the community is just self-sufficient.

If three digit SIC codes had been used, the analysis might indicate self-sufficiency for men's clothing (SIC 561) but not women's clothing (SIC 562). This indicates the desirability of using at least three-digit SIC codes.

A location quotient less than 1 suggests the community is not self-sufficient and may be able to supply locally what it previously imported. To make this judgement requires comparing location quotients among similar communities, plus examining the population-employment ratios and eventually doing feasibility studies.

POPULATION-EMPLOYMENT RATIO

Purpose

To measure the number of people in the local market per job in a particular trade or service sector. It is used to make inter-community comparisons of trade and service sectors.

Example

The community of Riverside is interested in learning about its apparel and accessory sector (SIC code 56). Some people feel there is little room for expansion in this field. Others argue the community could support more apparel stores or existing apparel stores should expand. Riverside uses the population-employment ratio to compare its retail apparel sector with similar communities, e.g., Mountainview, Booneville, Forest Grove, and Porterville.

Data Needed

1. Population of each community. The population of the three or four communities to be compared with the community. Annual population estimates are available from state agencies such as the Department of Administration or the Department of Revenue. Precise figures are available for census years, i.e., 1970 and 1980 from the Census of Population.
2. The number of local workers in a particular sector, defined by SIC code. The number of local workers in each sector, i.e., SIC code 56, apparel and accessory stores, is available from the State Department of Labor or Job Service.

How to Calculate the Population-Employment Ratio

The population of a particular city or village divided by the number of people employed in a particular trade or service sector in that city yields the population-employment ratio.

$$\text{Population Employment Ratio} = \frac{\text{Population of a City}}{\text{Number of employees in a particular trade or service in that city}}$$

The following data is needed to compute the ratios:

City	Population	Employment in Apparel and Accessory
Riverside	7,052	224
Forest Grove	6,758	123
Booneville	7,826	175
Mountainview	3,246	71
Porterville	7,833	108

Riverside population-employment ratio $= \frac{7,052}{244} = 28.90$

Forest Grove population-employment ratio $= \frac{6,758}{123} = 54.94$

Booneville, Mountainview, and Porterville have population-employment ratios of 44.72, 45.69, and 72.53, respectively. The next step is to compute the average, which is 49.36.

Interpretation

On the average, each retail apparel store worker "sells" to about 50 people. However, in Riverside each retail apparel store worker only sells to about 29 people. Why does Riverside have such a low population-employment ratio? It could be because the local merchant is aggressive and is servicing a much larger nonlocal market, or the local merchant is over staffed. In any case, the population-ratio here does not suggest any room for expansion. This agrees with the location quotient analysis.

SHIFT-SHARE

NATIONAL GROWTH COMPONENT

Purpose

To measure how many new jobs were created locally due to national economic trends.

Example

The community of Riverside has four sectors and wants to know if recent employment changes were due to national economic trends or other forces.

Data Needed

1. Workers employed in each sector both nationally and locally for at least two years. First, locate the SIC code of the industry or sector you want to study. This data is available from the U.S. Department of Labor or Commerce and can be found at many libraries. The most accessible source is County Business Patterns. You need to compare data for two years. For example, you might want to compare the number of workers in 1980 and 1982 in a certain sector, e.g., SIC code 37, transportation equipment manufacturing. The number of workers employed locally in the same SIC and years you identified nationally is available from County Business Patterns which is published annually. Again, you will need data for two years. The State Department of Labor and Job Service can also be helpful in locating this information. Also, be sure to use data from the same sources to reduce potential error from differences in how the data was collected.

How to Calculate

Here is how the Riverside data looks:

Sector	U.S. Employment (000) 1980	1982	% Change	Riverside Employment 1980	1982	% Change
A	1250	2250	80.00	50	75	50.00
B	600	800	33.30	70	100	43.00
C	900	850	-5.55	80	50	-37.50
D	450	325	-33.30	65	180	177.00
Total	3200	4225	32.03	265	405	46.5

The national growth component is calculated by multiplying the base year employment (1980 in our example) by the national average employment growth rate. The sum of the products is called the national growth component.

Sector	Local 1980 Employment		National Average Growth Rate		National Growth Component
A	50	x	32.03	=	16.02
B	70	x	32.03	=	22.42
C	80	x	32.03	=	25.62
D	65	x	32.03	=	20.82
	Community National Growth Component			=	84.88

Interpretation

The national growth component of 84.88 means 85 of the 140 new jobs in the sectors A, B, C, and D were due to national economic trends. Thus, if the Riverside economy was like the national economy it should have grown by 85 jobs. Likewise, sector A would have grown by 16.02 jobs if it was like the national economy, etc.

INDUSTRIAL MIX COMPONENT

Purpose

To determine whether the local economy is concentrated in industries that are growing slower or faster than the national average.

Data Needed

Same as the calculations of the national growth component.

How to Calculate

The industrial mix component is computed by multiplying the local employment in each economic sector by the difference in the national growth rate for that sector and the whole economy.

Sector	1980 Riverside Employment		Sector's National Growth Rate (%)		National Average Growth Rate %		Industrial Mix Component
A	50	x	(80.00	-	32.03)	=	23.89
B	70	x	(33.30	-	32.03)	=	.89
C	80	x	(-5.55	-	32.03)	=	-30.06
D	65	x	(-33.30	-	32.03)	=	-42.46

Community Industrial Mix Component = -47.65

Interpretation

The industrial mix component is negative. It suggests that Riverside's economy has 47.65 jobs less than it would have if its economic structure were identical to the nation. Sectors A and B are growing faster than the national average. However, that growth is offset by sectors C and D, which are growing slower than the national average. The negative industrial mix means that independent of national influences, the local sectors, on balance, grew slower than the national average and reduced local employment growth. Sectors C and D were the cause. If the industrial mix component were positive, it would suggest the local economy has relatively more people employed in fast growth sectors than the national average.

Riverside's negative industrial mix should lead the community to examine what is causing the slower growth. There are several reasons for a negative industrial mix. It could be a cyclic downtown. It could also be due to a shift

in markets or depletion of a resource. The negative industrial mix means the community needs to consciously seek economic activity that will offset the declining sectors. At the very least, the community should not seek activity linked to the declining sectors.

It is important to note that not all sectors of the local economy had a negative industrial mix. The community needs to identify its faster growing firms/sectors to determine if these sectors are likely to continue contributing to local employment change.

COMPETITIVE SHARE COMPONENT

Purpose

To determine whether local businesses are growing faster or slower than similar businesses nationally, i.e., more/less competitive.

Data Needed

Same as for the calculations of the national growth component.

How to Calculate

The competitive share component is calculated by multiplying the local employment in each economic sector by the difference in the growth rate for that sector nationally and locally. The results for each sector are summed up to give the community's competitive share. The Riverside case illustrates how to compute competitive share.

Sector	1980 Riverside Employment		Local Growth Rate for Sector		National Growth Rate for Sector		Competitive Share
A	50	x	(50.0	-	80.0)	=	-15.00
B	70	x	(43.0	-	33.3)	=	6.79
C	80	x	(-37.5	-	- 5.6)	=	-25.56
D	65	x	(177.0	-	-33.3)	=	136.69

Community Competitive Share Component = 102.92

Interpretation

The competitive share component suggests that Riverside gained an additional 102.92 jobs beyond national growth trends and its industrial mix. It indicates that Riverside created a greater share of employment growth than other areas in the nation, i.e., more competitive. The contribution of each sector, both positive and negative, is worth noting.

Shift-share analysis does not provide the reasons local firms were more competitive . It may be due to better management, new technology, more productive workers or other factors. To make this judgement requires further analysis of local firms versus industry averages.

Special Note

A simple check of the calculations is the sum of national growth, industrial mix and competitive share must equal total local employment change:

140 = 84.88 + (-47.65) + 102.92 = 140.15

EMPLOYMENT MULTIPLIER

Purpose

To determine how many new jobs will be created in a community resulting from an external economic change.

Example

A manufacturing plant in the City of Riverside expects to create 100 new jobs. Community leaders wonder how the manufacturer's expansion will affect total employment in the local economy. They decide to use the employment multiplier to estimate the total number of the new jobs in Riverside.

Data Needed

1) Location quotients for the major employment sectors in the community (see section on location quotients).
2) Employment in the community by sector is available from the State Department of Labor or Job Service.

How to Calculate the Employment Multiplier

For simplicity, let us say Riverside has a two-sector economy. One sector is manufacturing and the other is trade. The information we need is:

	1982 LQ	1982 Employment
Manufacturing	4	1,500
Trade	2	1,832
Total		3,332

The next step is to determine the percentage of each sector serving non-local needs. The formula for determining that percentage is: $(1 - \frac{1}{LQ}) \times 100\%$ = percentage of the community economy serving non-local needs. This is only computed for sectors with a location quotient greater than one (1), sectors with a LQ less than one (1) are assumed to serve only local (non-export) markets.

For manufacturing, the proportion of manufacturing employment serving non-local needs is $1 - \frac{1}{4} = \frac{3}{4}$ = 75 percent. There were 1,500 workers employed in Riverside manufacturing plants. Multiplying 1,500 workers by 75 percent, we find 1125 workers are serving non-local needs. For the trade sector, 50 percent of the workers in that sector serve non-local needs, e.g., $1 - \frac{1}{2} = 50\%$. If we multiply 50% by the number of workers in that sector, we get 916. We add the number of workers in each sector serving non-local needs (1,125 + 916 = 2,041). In other words, 2,041 workers in the Riverside economy are serving non-local needs.

The employment multiplier is the total employment divided by the employment serving non-local needs, i.e., export.

$$\text{Employment Multiplier} = \frac{\text{Total Employment}}{\text{Export Employment}}$$

$$1.63 = \frac{3,332}{2,041}$$

Interpretation

The employment multiplier is 1.63. If the Riverside manufacturing plant creates 100 new jobs, there will be a total of 163 new jobs in the community, with 63 of the new jobs being created outside the manufacturing plant.

INCOME MULTIPLIERS

Purpose

To determine the impact of an external economic change on a community's income.

Example

The community of Riverside anticipates that a large prison will be built at the edge of the city. How will the prison payroll affect community income? Riverside can get a rough answer to that question by determining its income multiplier.

Data Needed

An ability to make some accurate guesses about the local economy. To find the information you need for the income multiplier, you need to ask people familiar with the community's economy these questions:

a) What percentage of people's income is spent locally?

b) What percentage of the money that is spent locally goes to labor-intensive services (fast food, auto repair, etc.) vs. external purchases (automobiles, stereos, television, etc.)

A note of caution: never ask a community leader to estimate the entire income multiplier. Generally, they tend to overestimate it. Hence, it is wise to ask them questions (a) and (b) to estimate better what the multiplier is.

This could be done through a survey of local residents and merchants.

How to Calculate the Income Multiplier

$$k = \frac{1}{1 - (MPC_L \times PSY)}$$

MPC_L means the portion of people's income that is spent locally. The community of Riverside is within easy driving distance of a major regional shopping center. Thus, many items are purchased outside the community. In addition, there are many in-commuters to the city who spend much of their income where they live rather than in Riverside. The estimate is only 35 percent of people's income is likely to be spent in Riverside. Hence, the MPC_L is .35.

The next question to ask is what proportion of local spending becomes local income? That is PSY in the formula. If local spending is for services such as restaurants, taverns, auto repair shops, and other types of labor intensive businesses the PSY may be as high as .50 to .60. However, if people spend the majority of their income on purchases with little local labor content (such as automobiles), the PSY may be as low as .25 etc,. Let us say the PSY is .45. Plugging the numbers into the formula our income multiplier is:

$$\frac{1}{k - (MPC_L \times PSY)} = \frac{1}{1 - (.35 \times .45)} = \frac{1}{1 - .15} = \frac{1}{.85} = 1.18$$

The income multiplier for Riverside is 1.18.

If the PSY is higher, e.g., .60 and the MPC_L is higher, e.g., .50, the multiplier becomes

$$k = \frac{1}{1 - (.50 \times .60)} = \frac{1}{1 - .30} = \frac{1}{.7} = 1.43$$

Interpretation

The income multiplier of 1.18 suggests the total income change from the prison development is slightly greater than the prison's gross payroll. It means that for every prison payroll dollar, there will be a change of $1.18 in

local income. The interpre- tation is similar for the multiplier of 1.43. The important point is the size of the multiplier is sensitive to estimates of MPC_L and/or PSY.

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Note to the Dedicated Reader of Bibliographies

The following list of readings may at first appear unusual since some of the papers seem to contradict each other and in some cases present a strong argument that the tool does not accomplish its staced purpose. The purpose of the bibliography is: 1) to give the reader more detailed insight about the tool and 2) to create some sensitivity to misuse and misinterpretation of the tool. It is recognized that the outcome of this debate may be rejection of the tool and community economic analysis completely, but that would be the wrong response. The purpose is to highlight the still imperfect understanding we have of community economic analysis. Many users of this manual will need to push ahead with imperfect data and tools, but we hope with a little better understanding of what they are doing.

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